



2/20

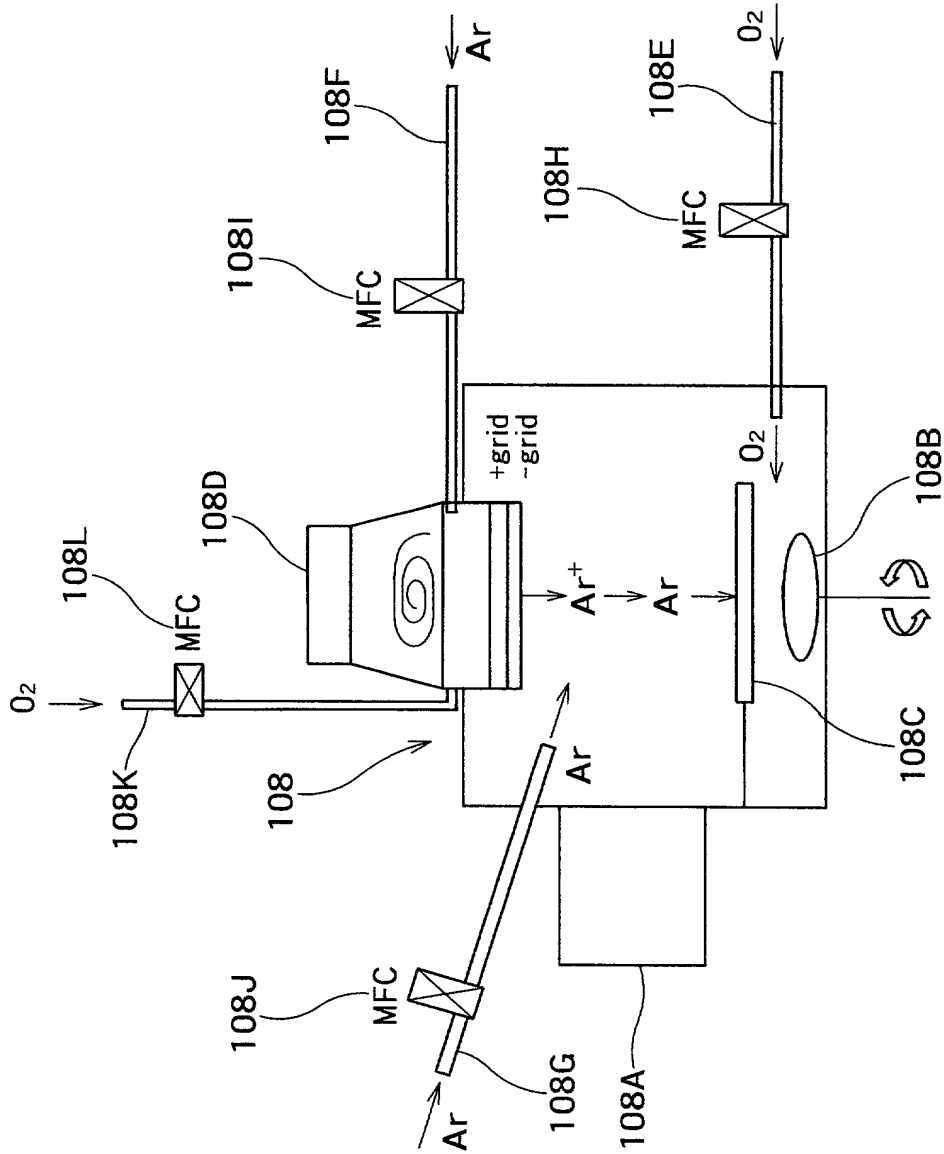


FIG. 2

3/20

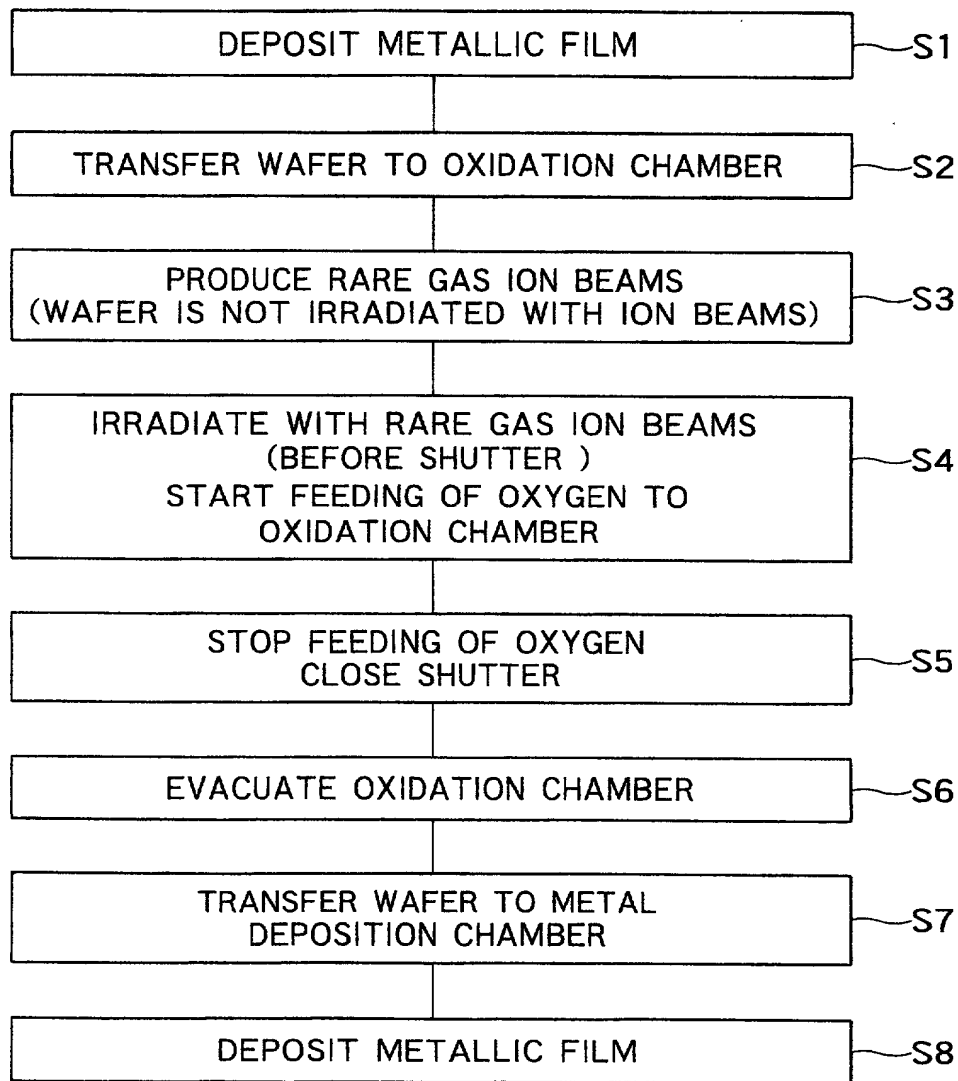


FIG. 3

4/20

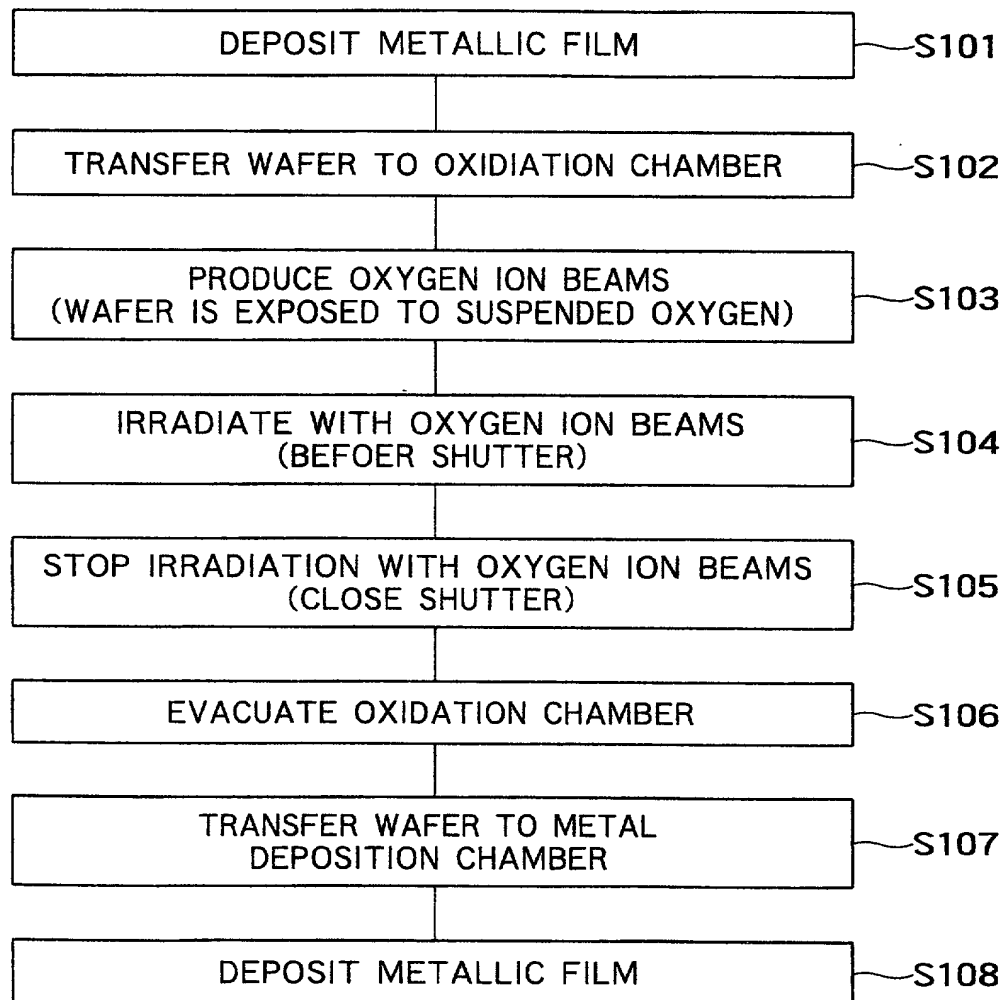


FIG. 4

5/20

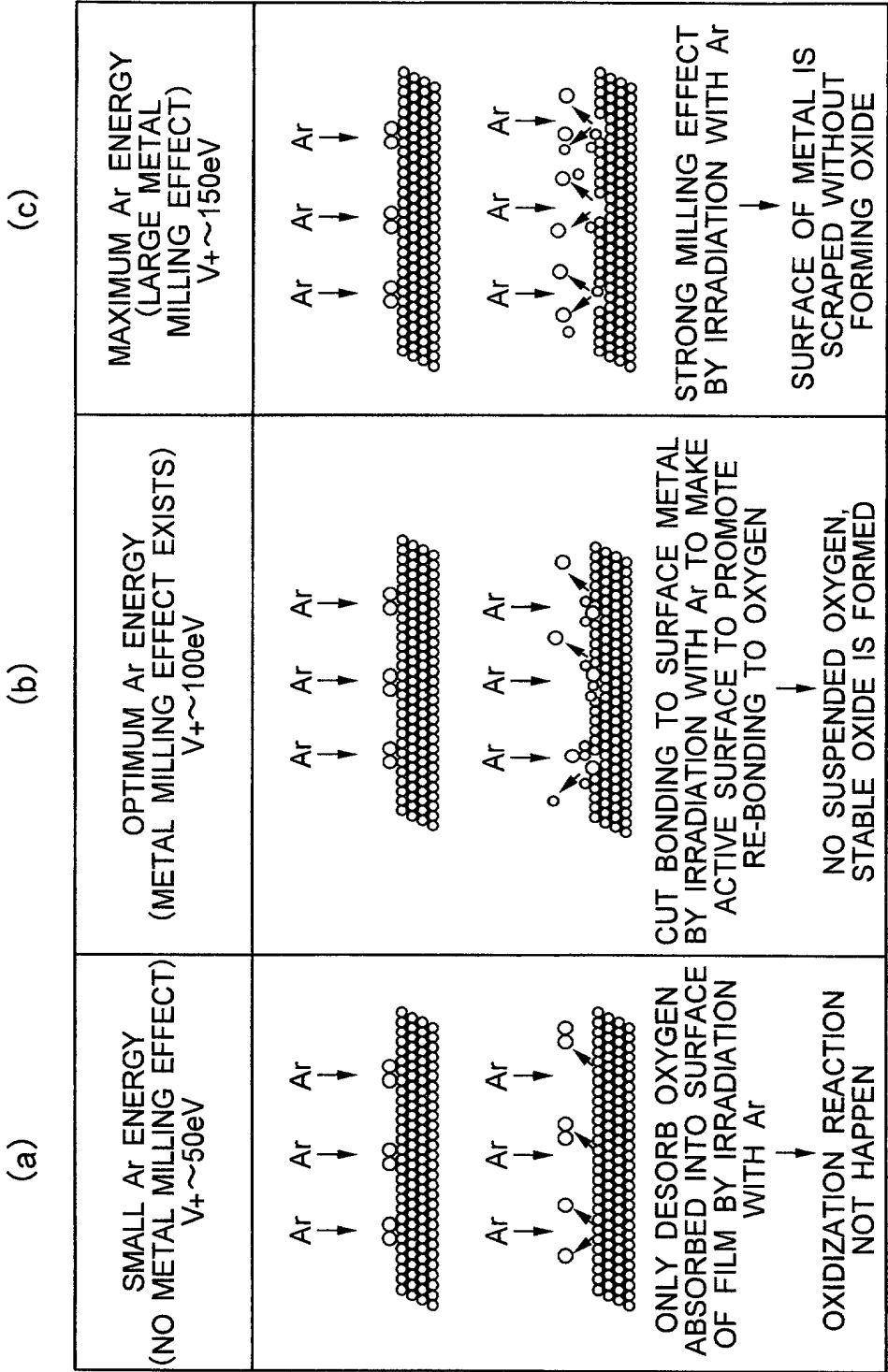


FIG. 5



FIG. 6

7/20

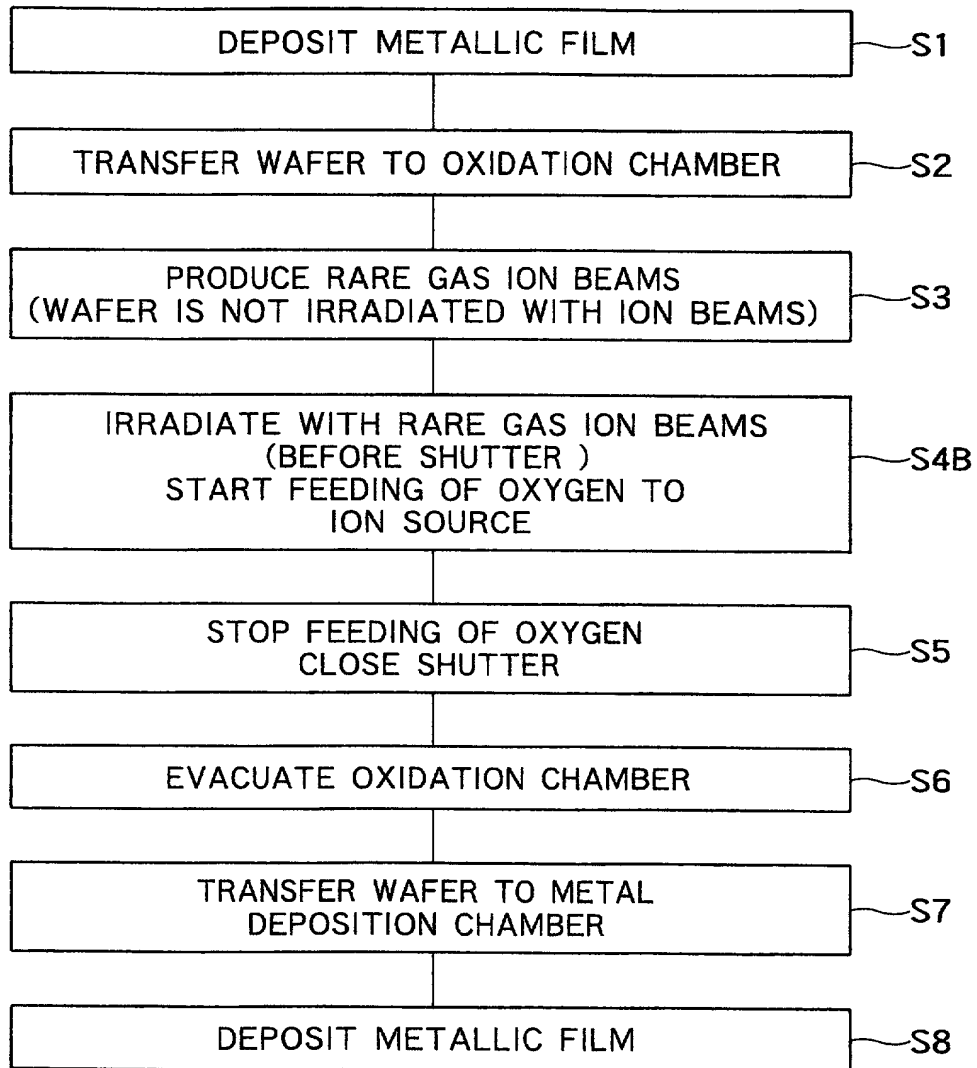


FIG. 7

8/20

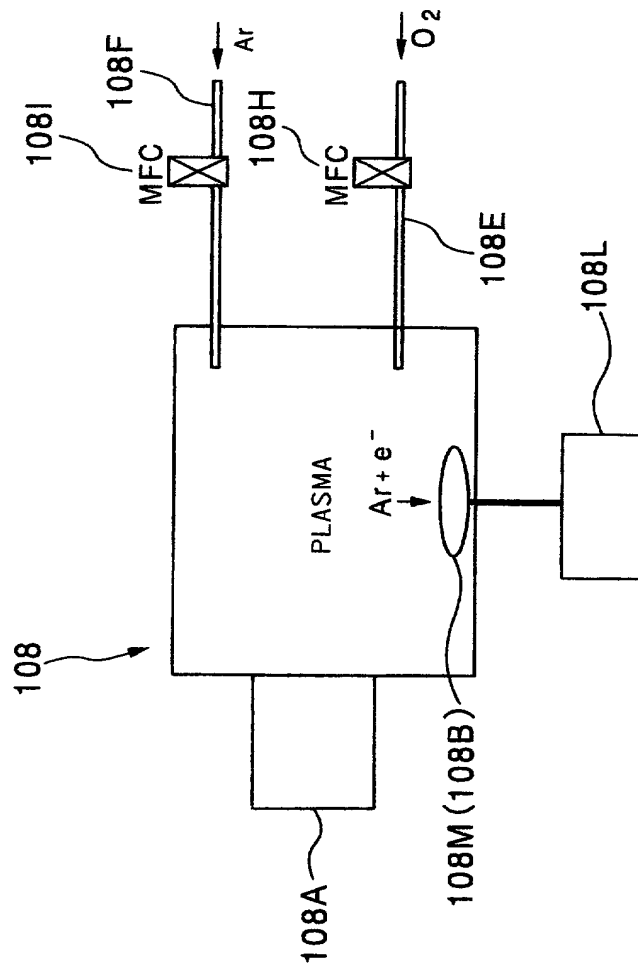


FIG. 8

9/20

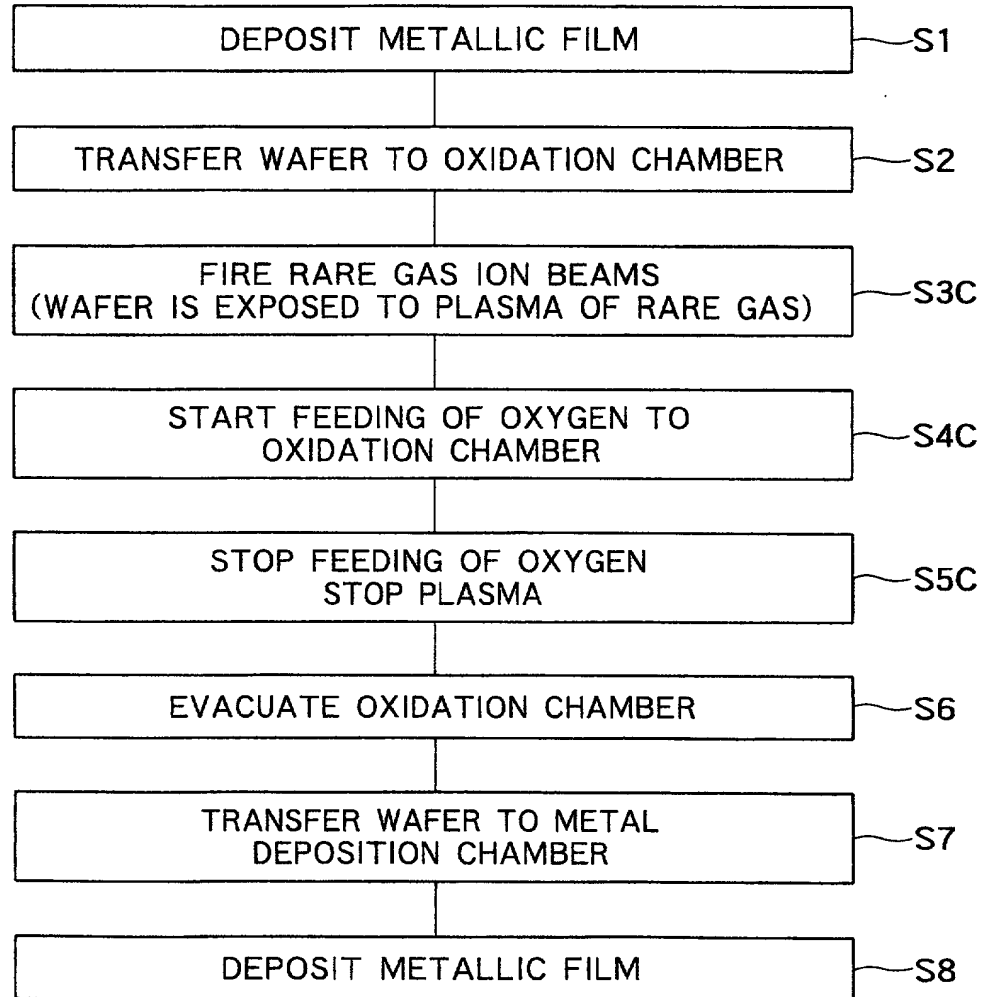


FIG. 9

10/20

FIG. 10

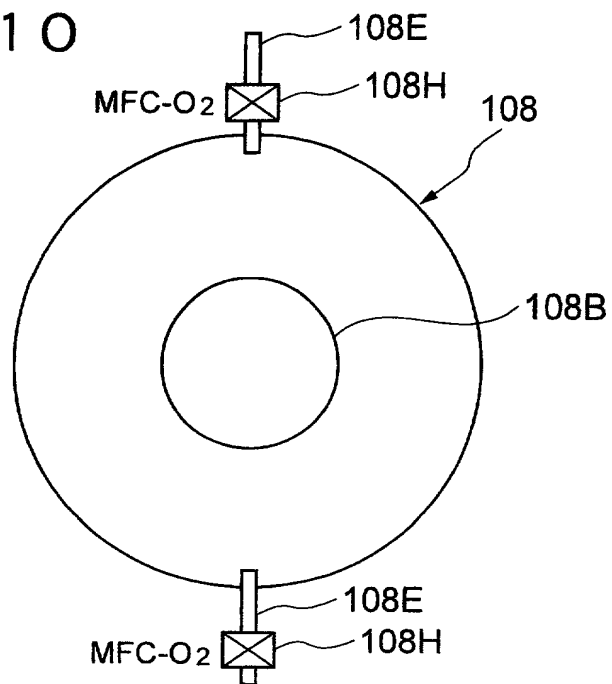
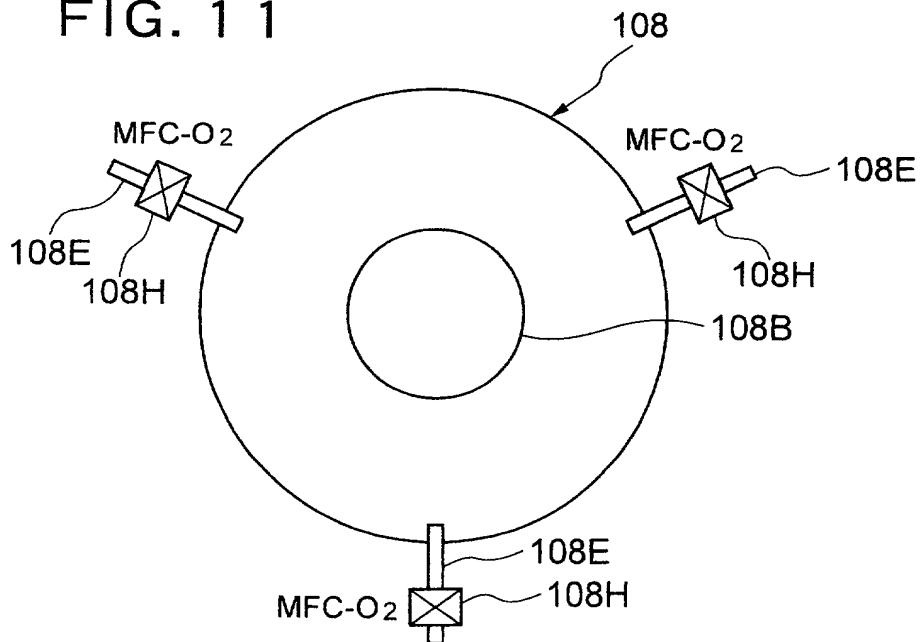


FIG. 11



11/20

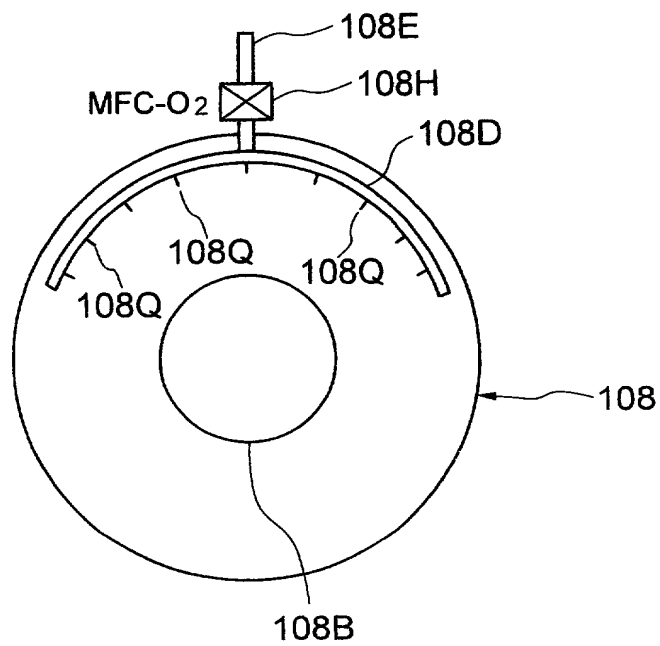


FIG. 12

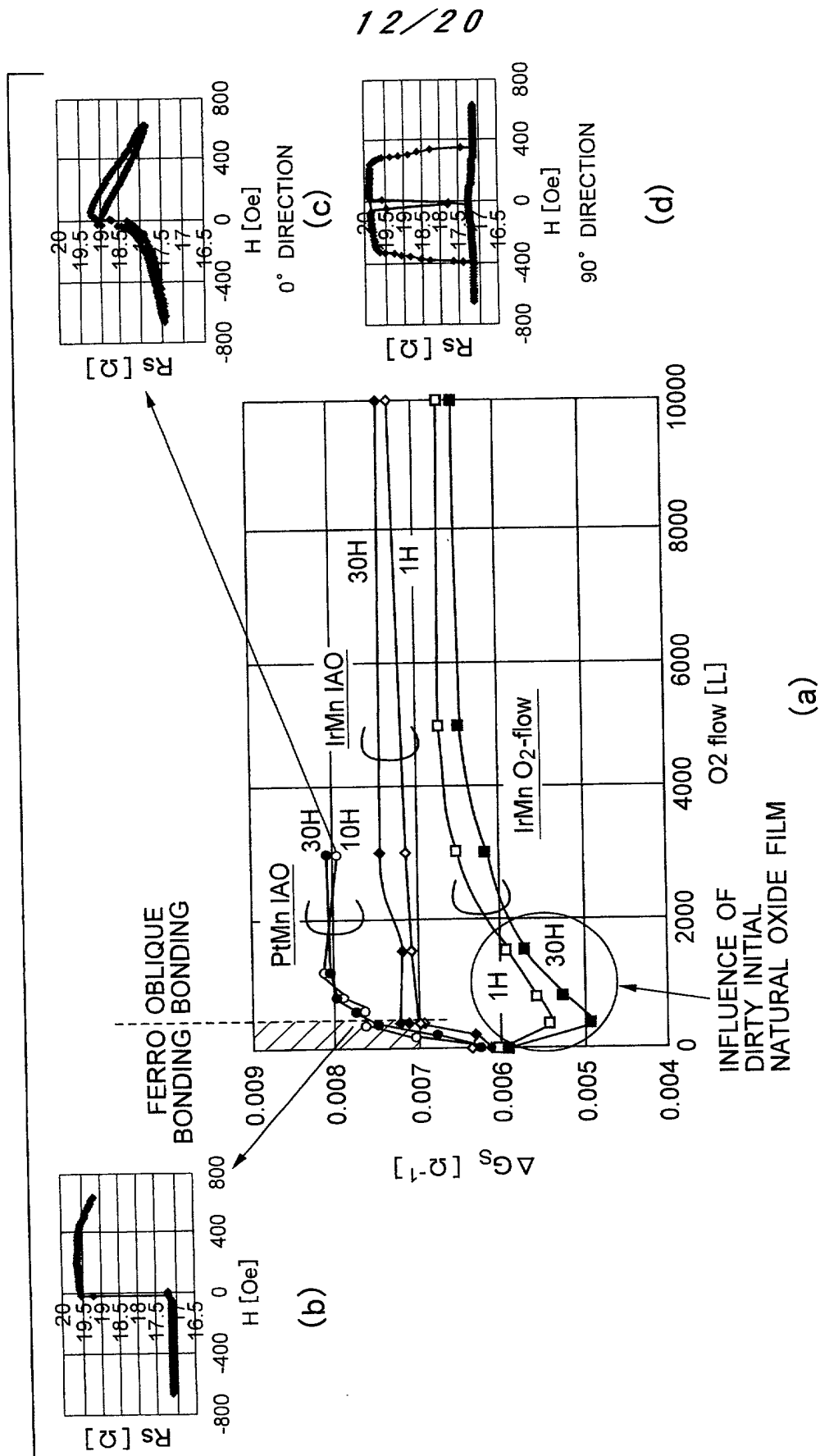


FIG. 13

13/20

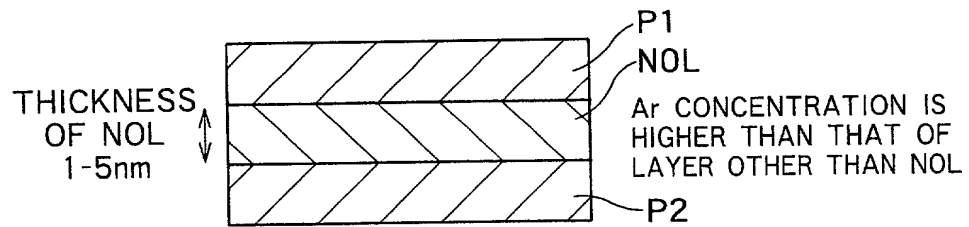


FIG. 14

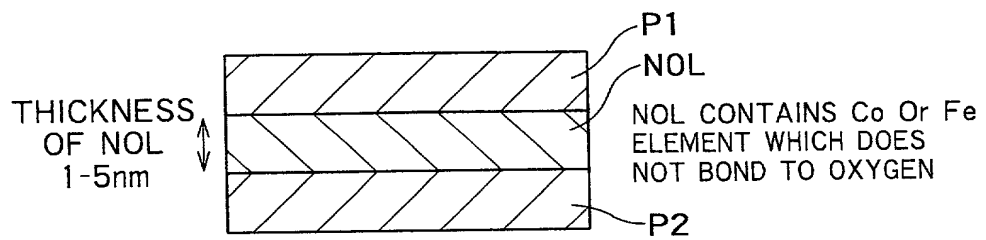
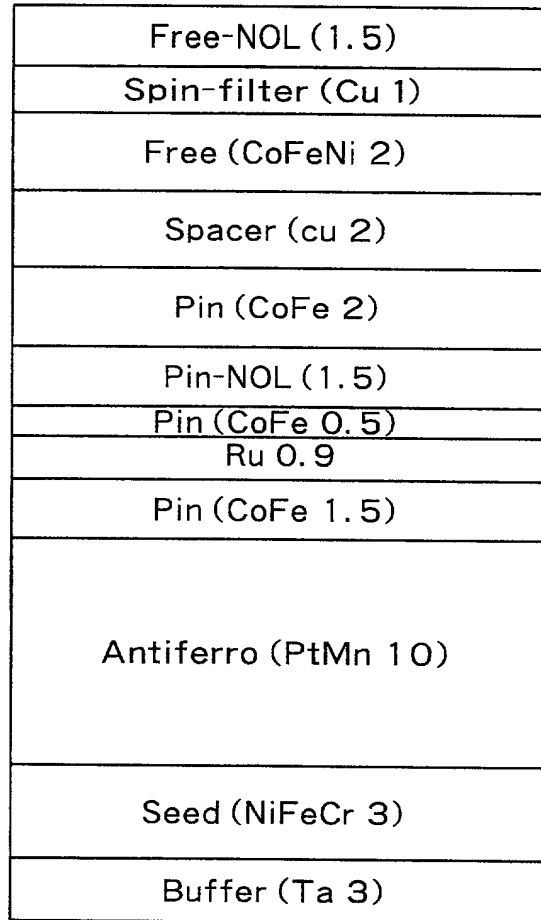


FIG. 15

14/20

SENSE CURRENT



Free-NOL (1.5)
Spin-filter (Cu 1)
Free (CoFeNi 2)
Spacer (cu 2)
Pin (CoFe 2)
Pin-NOL (1.5)
Pin (CoFe 0.5)
Ru 0.9
Pin (CoFe 1.5)
Antiferro (PtMn 10)
Seed (NiFeCr 3)
Buffer (Ta 3)

FIG. 16

15/20

SENSE
CURRENT



Free-NOL (1.5)
Spin-filter (Cu 1)
Free (CoFeNi 2)
Spacer (Cu 2)
Pin (CoFe 2)
Pin-NOL (1.5)
Pin (CoFe 0.5)
Ru 0.9
Pin (CoFe 1.5)
Antiferro (PtMn 10)
Seed (NiFeCr 3)
Buffer (Ta 3)

FIG. 17

16/20

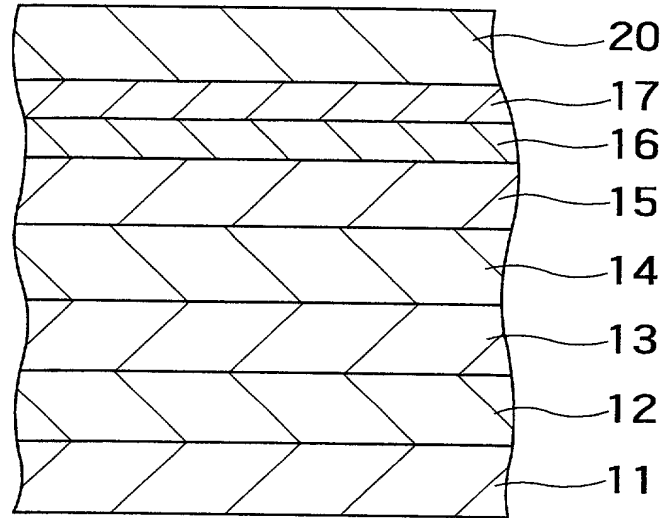


FIG. 18

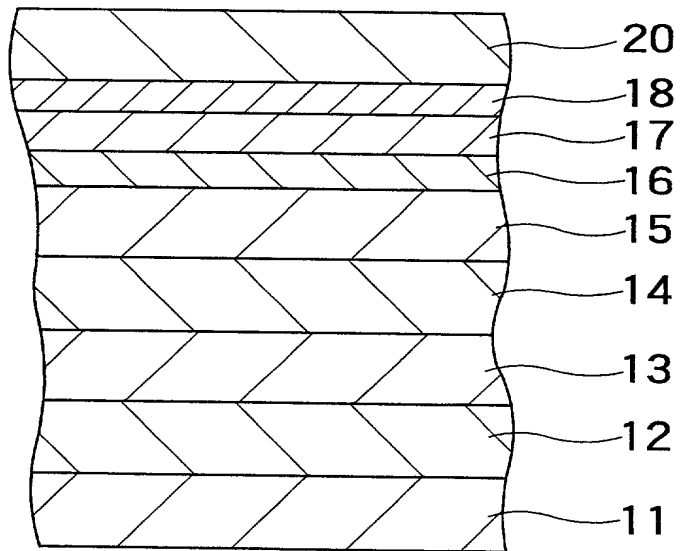


FIG. 19

17/20

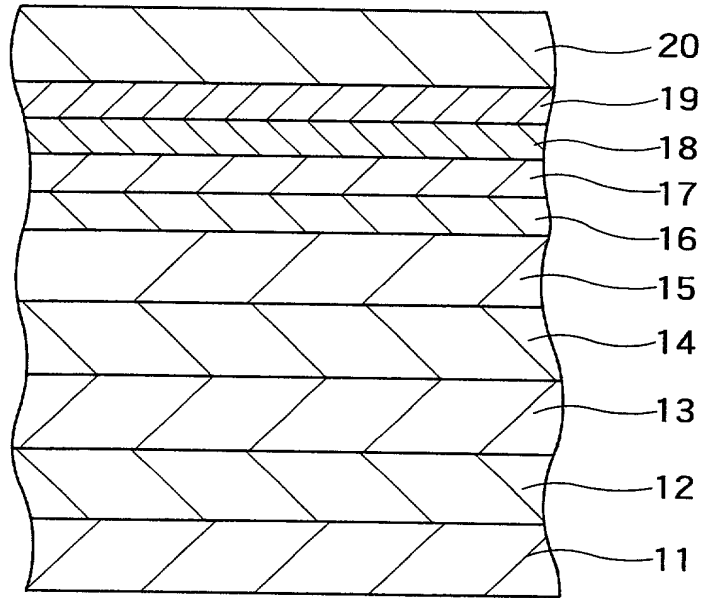


FIG. 20

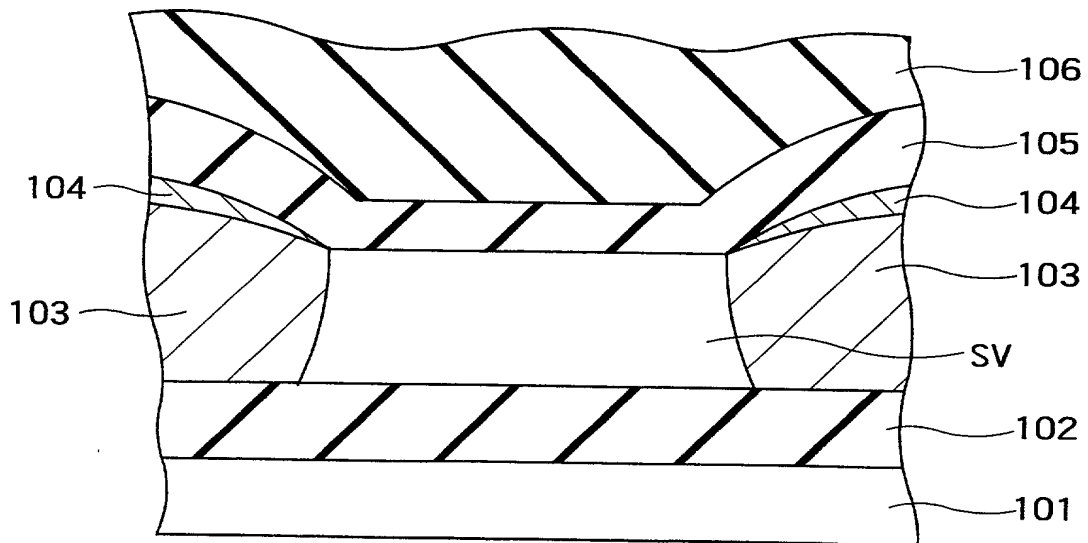


FIG. 21

18/20

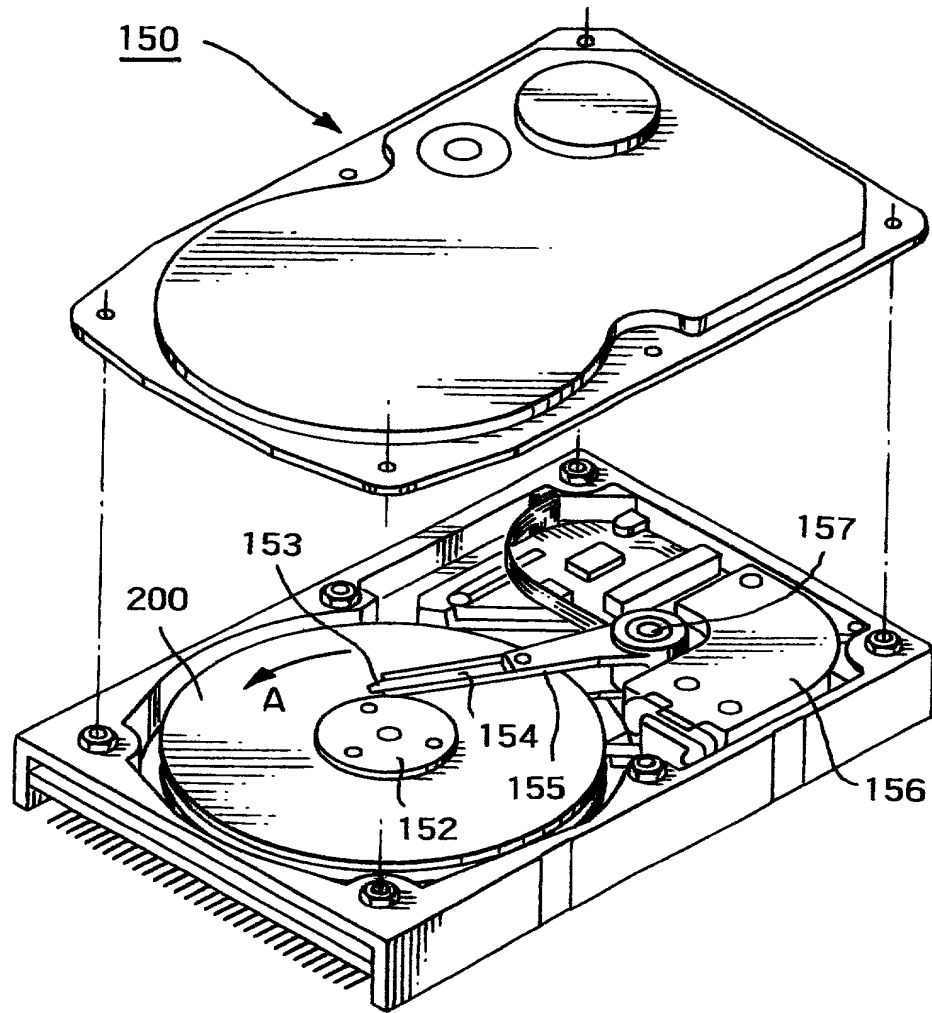


FIG. 22

19/20

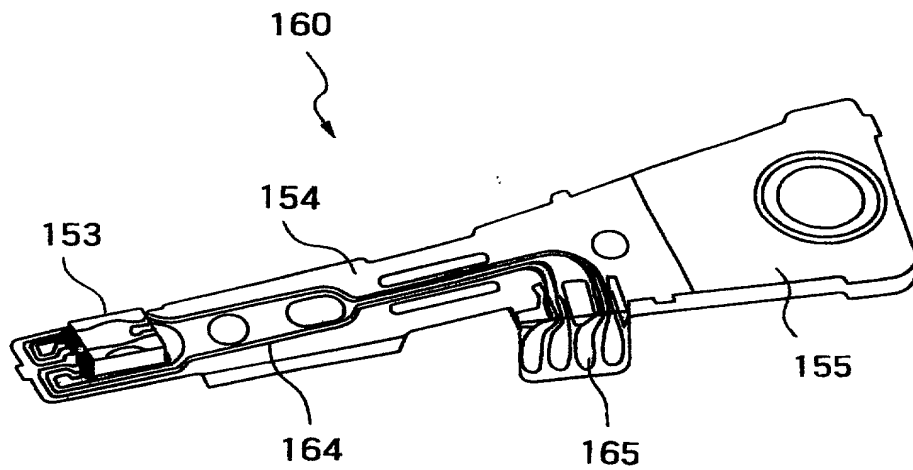
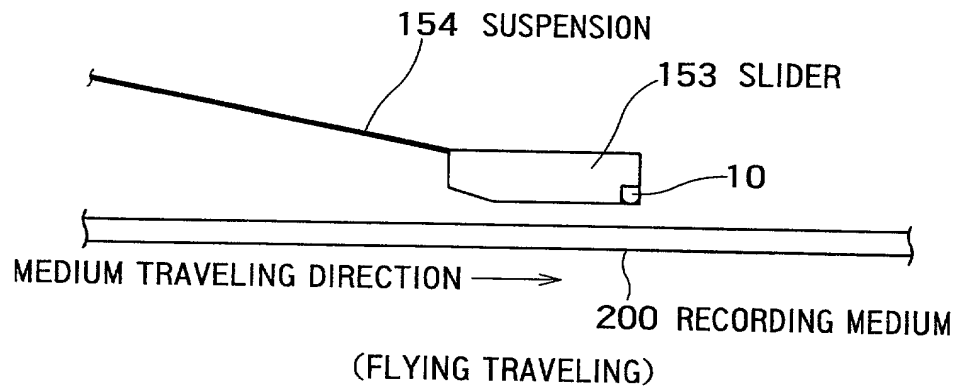
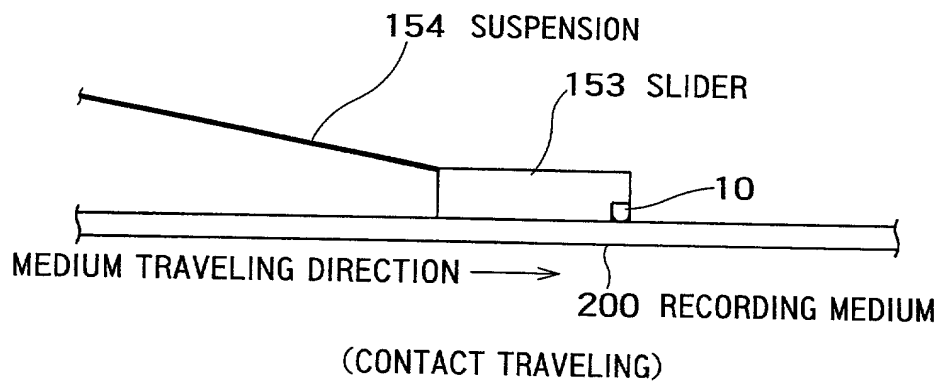


FIG. 23

20/20



(a)



(b)

FIG. 24